

TAPROBANICA, ISSN 1800–427X. Vol. 14, No. 01 (2025): pp. 39–47, pls. 3–5.
 Published by Research Center for Climate Change & Faculty of Mathematics & Natural
 Sciences, Universitas Indonesia, Depok 16424, INDONESIA.
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<http://www.taprobanica.org>
<https://doi.org/10.47605/tapro.v14i1.350>



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urn:lsid:zoobank.org:pub:057F4815-4DAE-4406-B5C0-3768C453F90F

A NEW SPECIES OF TRAPDOOR SPIDER (ARANEAE: IDIOPIDAE: *Heligmomerus*) FROM THE SOUTHERN TIP OF INDIA

Submitted: 27 January 2025, Accepted: 25 April 2025, Published: 26 May 2025
 Subject Editor: Danniella Sherwood

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Abstract

A new species of the genus *Heligmomerus* is described based on 10 female specimens collected from the foothills of Pothaimalai, on the outskirts of the Kalakad-Mundanthurai Tiger Reserve, Tirunelveli District, Tamil Nadu, India. The new species is distinguished from all other Indian and Sri Lankan congeners in combination with several non-overlapping morphological characters. Detailed natural history of the new species, intraspecific variation in spermathecal morphology, and meristic and mensural data from the type series are given. Additionally, comments on the transfer of *Idiops garoensis* (Tikader, 1977) to the genus *Heligmomerus* by Sen *et al.* (2012) are provided.

Keywords: *Idiops garoensis*, Morphology, Mygalomorphae, Peninsular India, Tamil Nadu, taxonomy

Introduction

The trapdoor spider family Idiopidae Simon, 1889 (Opisthothelae: Mygalomorphae) is currently represented by 23 genera and 446 species globally (Fonseca-Ferreira *et al.* 2025, World Spider Catalog 2025). On the Indian subcontinent, Idiopidae is represented by four genera, namely: *Heligmomerus* Simon, 1892; *Idiops* Perty, 1833; *Titanidiops* Simon, 1903; and *Scalidognathus* Karsch, 1892, with a total of 26 described species (Sanap & Mirza 2011, Pratihari & Das 2020, Pratihari *et al.* 2022, Schwendinger *et al.* 2024). The genus *Heligmomerus* is distributed in southern and eastern Africa, and South Asia (India and Sri Lanka), and

represented by 14 species (Simon 1892, Pratihari *et al.* 2022, World Spider Catalog 2025).

In India and Sri Lanka, the genus *Heligmomerus* has been one of the least studied idiopid genera with a complicated taxonomic history (Simon 1892, Gravely 1915, 1921, 1935, Roewer 1942, Tikader 1977, 1987, Brignoli 1983, Siliwal *et al.* 2005, 2010, 2020, Sen *et al.* 2012, Sanap & Mirza 2015, Pratihari *et al.* 2022). *Heligmomerus taprobanicus* Simon, 1892, the type species of the genus, was first described based on a single subadult female specimen from Kandy, Ceylon (now Sri Lanka), along with *H. prostans* Simon, 1892 based on a single female specimen collected from Kodaikanal, Palani

Hills in Tamil Nadu, India (Simon 1892). Subsequently, Gravely (1915) described *Idiops biharicus* (Gravely, 1915) based on a single male specimen from “Sahibgunge in Bihar” (currently in Jharkhand, India) and *Acanthodon barkudensis* (Gravely, 1921) based on a single male and female specimen from “Barkuda and Rambha on the mainland at the southern end of the Chilka Lake” in Odisha, India (Gravely 1921). Two decades after their descriptions, Gravely (1935) transferred both these species to the genus *Heligmomerus* based on the dorsal excavation on tibia III. However, subsequent workers missed Gravely’s note and continued listing them under the genus *Idiops* in their work (Roewer 1942, Tikader 1987, Siliwal *et al.* 2005). Siliwal *et al.* (2010) did take note and followed the transfers by Gravely (1935) and also provided additional morphological data on *H. barkudensis* based on freshly collected topotypic specimens, as well as specimens collected from multiple localities in Odisha State. Tikader (1977) described *Acanthodon garoensis* based on a single male specimen collected from “Degrangiri, Garo hills, in Meghalaya”, but Brignoli (1983), in his checklist, listed this Indian species under the genus *Idiops*. Subsequently, the species was again listed as *Acanthodon garoensis* by Tikader (1987), and recently, Siliwal *et al.* (2005) placed it in the genus *Idiops*. Interestingly, Sen *et al.* (2012) transferred *I. garoensis* to *Heligmomerus* based on a single male specimen collected from the Scottish Church College campus, Kolkata in West Bengal, which is about 375 km southwest of the type locality. Three more species—*H. maximus* Sanap & Mirza, 2015 (based on three females) from near Picket station in Peppara Wildlife Sanctuary, Kerala; *H. wii* Siliwal, Hippargi, Yadav & Kumar, 2020 (based on three males) from the Wildlife Institute of India campus in Dehradun, Uttarakhand, and *H. jagadishchandra* Das, Pratihari, Khatun & Diksha, 2022 (based on a single male) from Keshpur, West Medinipur, West Bengal—have subsequently been described from India (Sanap & Mirza 2015, Siliwal *et al.* 2020, Pratihari *et al.* 2022). Thus, seven species of the genus *Heligmomerus* are currently recognized from India and a single species from Sri Lanka (Simon 1892, Pratihari *et al.* 2022).

During a recent arachnid survey in Tamil Nadu state, we collected 10 female idiopid trapdoor spiders from the foothills of Pothaimalai, on the outskirts of Kalakad-

Mundanthurai Tiger Reserve, Tirunelveli District. The specimens were tentatively assigned to the genus *Heligmomerus* based on their anterior lateral eyes being situated close to the clypeal edge, and the presence of a dorsal depression on tibia III (Raven 1985, Siliwal *et al.* 2020). All 10 specimens together differed from previously described congeners with a combination of several non-overlapping morphological characters, such as spermathecae structure; ocular measurements; the number of cuspules on labium; presence of spinules on coxae II and IV and metatarsi I and II, and their orientation; leg formula; and in maximum total length. In this paper, we describe this material as a new species based on its distinctive morphology. Detailed natural history notes, along with intraspecific variation in spermathecae structure, meristic, and mensural data, are given. Additionally, the transfer of *Idiops garoensis* to the genus *Heligmomerus* by Sen *et al.* (2012) is discussed.

Materials and Methods

Taxon sampling and processing. Burrows were spotted on the ground during the daytime and carefully dug out for their entire lengths using a medium-sized shovel and a digging bar. Burrows were then measured in the field by using a standard plastic ruler. All specimens were collected from active burrows, and two live adult individuals were photographed using a Canon 80D DSLR camera mounted with a 100 mm macro lens and a pair of external flashes. Right leg II of a single individual (NRC-AA-1200) and two whole spiderlings were collected in molecular grade ethanol and stored at -20°C for genetic analysis. Specimens were then euthanized using isoflurane, fixed in 6% formaldehyde for ~24 hours, washed and kept in tap water for ~12 hours, and then finally transferred to 70% ethanol for long-term storage. Spermathecae of nine out of 10 (one either immature or damaged during the dissection: NRC-AA-1201) were dissected and cleared using teasing needles under a ZEISS Stemi 305 stereo dissecting microscope, kept in clove oil for 10 minutes, and transferred to 70% ethanol. The left chelicera of the holotype was dissected and stored in 70% ethanol.

The holotype, along with five paratypes, is deposited in the Museum and Research Collection Facility at the National Centre for Biological Sciences, Bengaluru (NCBS), and the remaining four paratypes are deposited in the

museum of the Bombay Natural History Society, Mumbai (BNHS).

Mensural and meristic data. Morphological data were collected from all 10 specimens of the new species. Comparative morphological data of *Heligmomerus maximus* were collected from the holotype, and of *H. prostans* were collected from the topotypes (Appendix). Comparative morphological data on remaining Indian and Sri Lankan congeners were obtained from the published literature (Simon 1892, Pocock 1900, Gravely 1915, 1921, Tikader 1977, Siliwal *et al.* 2010, 2020, Pratihari *et al.* 2022). Specimens were examined under a ZEISS Stemi 305 stereomicroscope. All measurements are in millimetres. Measurements of body parts were taken consistently from the left side of each specimen (except for damaged leg segments, in which case measurements were taken on the right side) with a Mitutoyo digital vernier calliper (to the nearest 0.01 mm). Measurements of eyes were taken from calibrated images made under a microscope; distances between eyes, measured at narrowest points, and eye diameters were measured at the broadest points. Length of palp and leg segments were measured between proximal and distal articulations along the dorsal midline except for coxae and maxillae lengths, which were measured from the ventral side; leg joints were excluded from the measurements; midwidths of palp and legs segments were measured roughly at their midpoints; length of coxae and trochanters were excluded from leg formula. Meristic data were counted bilaterally wherever applicable. Superior tarsal claw dentation states evaluation was the presence or absence of claw teeth, as well as the presence or absence of bifid teeth on the left and right sides, respectively. Total length includes carapace length (Ca L) and abdomen length (Ab L); carapace length (Ca L) measured longitudinally at midpoint between anterior and posterior margins, carapace width (Ca W) measured at the widest points of carapace; chelicerae length (Ch L) measured from anterior margin of rastellum up to anterior border of carapace, chelicerae width (Ch W) measured at the base of chelicerae; labium length (Lb L) measured at midpoint between anterior and posterior margin of labium, labium width (Lb W) measured at the posterior margin of labium; sternum length (St L) measured longitudinally from base of the labium to posterior most point of the sternum, sternum width (St W) measured at widest points of sternum; abdomen length (Ab L) measured along

ventral side from anterior edge of abdomen up to the base of posterior median spinnerets, abdomen width (Ab W) measured at widest points of abdomen; * indicates incomplete data due to minor damage.

Abbreviations. Ab, abdomen; AME, anterior median eye; ALE, anterior lateral eye; Ca, carapace; Ch, chelicerae; Ch T, cheliceral teeth; Cx, coxa; Fe, femur; L, length; Lb, labium; MOQ, median ocular quadrate; Mt, metatarsus; Mx, maxillae; Og, ocular group; r, retrolateral; Ra, rastellum; p, prolateral; Pa, patella; PLE, posterior lateral eyes; PLS, posterior lateral spinnerets; PME, posterior median eyes; PMS, posterior median spinnerets; St, sternum; Ta, tarsus; Ti, tibia; TL, total length; v, ventral; W, width; BNHS SP, Bombay Natural History Society, Mumbai (BNHS); AK-SC, AK field series.

Results

Taxonomy

Heligmomerus Simon, 1892

Type species. *Heligmomerus taprobanicus* Simon, 1892 by original designation.

Diagnosis. Members of the genus *Heligmomerus* are distinguished from all other idiopid genera by having the following combination of characters: the anterior lateral eyes being set close together, far from the rest of the eyes, on the clypeal edge; the absence of posterior sternal sigilla; two rows of cheliceral teeth; and by the presence of a saddle-shaped dorsal depression on tibia III (Raven 1985, Siliwal *et al.* 2020).

Heligmomerus australis sp. nov.

(Figs. 1–6, Sup. Fig. 1; Sup. Tables 1–3)

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Holotype. Adult female, NRC-AA-1198, collected from the foothills of Pothaimalai (8°25'19"N, 77°35'34"E; alt. 140 m a.s.l.), on the outskirts of Kalakad-Mundanthurai Tiger Reserve, Tirunelveli District, Tamil Nadu, India, by Akshay Khandekar and team on 7 May 2021.

Paratypes. Nine adult females, NRC-AA-1199–NRC-AA-1203, BNHS SP 402–BNHS SP 405, same locality and collection data as holotype.

Diagnosis. A large-sized trapdoor spider with maximum total length 29.46mm and maximum

carapace length 13.30mm ($n=10$); AME less than a diameter apart from each other, PME nearly one diameter apart from each other; a total of 8–20 cuspules on labium, out of which 4–7 cuspules in anterior row; a few thinner, sub equal and uncurved spinules on coxae II and IV; spinules present on metatarsi I and II; leg formula 4132; spermathecae with paired lobes having fairly widely spaced elongated stalks which are slightly broader at base and gradually narrowing distally, both stalks bent outward distally with circular to oval, globular, apical lobes facing away from each other and upward ($n=6/9$) or sometimes just facing upward ($n=3/9$); rarely, each stalk with a small retrolateral tubercle just posterior to distal bend ($n=1/9$).

Description of holotype. Adult female (total length 28.74) is in good condition except spermathecae and left chelicera dissected; other minor artifacts of preservation are given in the respective sections below. Carapace slightly longer (12.30) than wide (10.49), broader anteriorly, and widest between leg II; two small depressions on posterior end; carapace without granules, mostly glabrous, sparsely covered with bristles of variable sizes (some broken) denser on margins; few thick and long bristles present, a pair on clypeal end and on caput, and single bristle between AME-AME. Fovea U-shaped, deep; three striae on lateral sides of fovea, anterior stria deepest, followed by posterior and the middle respectively; caput raised, slightly more elevated than ocular area, somewhat flattened on top. Eight eyes in three rows, ALE situated far from AME on clypeal edge, posterior row procurved, ALE, PLE, and PME oval, AME circular. Ocular group longer (2.60) than wide (2.19); MOQ not square, 1.05 long, 1.00 front width, 1.11 back width. Diameter: AME 0.40, PME 0.48, ALE 0.67, PLE 0.41; distance between ALE-ALE 0.21, ALE-AME 1.21, ALE-PLE 1.63, AME-AME 0.34, AME-PLE 0.58, AME-PME 0.19, PLE-PME 0.41, PME-PME 0.50.

Maxillae longer (3.55 anteriorly and 4.71 posteriorly) than wide (2.86), covered with bristles of variable sizes, denser on prolateral side; 165 (left) and 160 (right) cuspules of unequal sizes which are thicker anteriorly, few extended onto antero-ental edge; anterior lobe distinct; anterior margin straight, posterior margin obscure. Labium wider (2.88) than long (2.14); covered with bristles of variable sizes which are longer anteriorly; a total of 11 cuspules on anterior margin, five of these larger

than the rest and situated in anterior horizontal row. Labiosternal groove shallow, slightly procurved. Chelicerae longer (5.65) than wide (2.73); a total of nine teeth in prolateral row and five in retrolateral row of left chelicera; fangs narrowing towards distal end, pointed at end; rastellum strong, slightly raised, 44 (left) and 43 (right) thick shorts spines, surrounded by bristles; a pair of glabrous bands on dorsal surface of chelicerae. Sternum slightly longer (7.13) than wide (6.47), broadest between coxae II and III, slightly elevated at centre, slopping laterally, posterior angle acute; sternum covered with bristles of variable sizes; present only on anterior half and on margins, and mostly detached from posterior half after preservation; bristles longer on margins. Two pairs of sigilla, anterior pair 0.59 in diameter and 3.02 apart; median pair 0.72 in diameter and 3.47 apart, separated from anterior pair by 1.19; all oval, finely granular; posterior pair absent.

All segments of palp and all legs longer than wide; coxae somewhat laterally compressed, coxae IV longest and broadest; trochanters somewhat laterally compressed, distinct mound on ventral side except trochanters III; femora of palp, legs I and II sub-equal in width, somewhat laterally compressed; femora III and IV proximally broader, narrowing towards distal end; femora III cylindrical and shorter than others; femora IV somewhat laterally compressed; patellae distally broader, narrowing towards proximal end, somewhat dorsoventrally flattened, patellae IV longest; tibiae sub-equal in width, those of palp, legs I and II somewhat dorsoventrally flattened; tibiae III and IV sub-cylindrical; tibiae III shorter than the rest, with large proximal depression on dorsal side; metatarsi proximally broader, narrowing towards distal end; metatarsi I and II slightly dorsoventrally flattened, metatarsi III sub-cylindrical, metatarsi IV somewhat laterally compressed and longer than others; tarsi of palp, legs I and II proximally broad and narrowing towards distal end, dorsoventrally flattened; tarsi III and IV equal in width, cylindrical; tarsi of palp longer than others.

Leg formula 4132, length: I=20.94 (6.79+4.65+4.67+3.65+1.18); II=18.60 (5.92+4.15+3.78+3.40+1.35); III=19.52 (5.23+4.70+2.97+4.09+2.53); IV=26.46 (7.21+5.48+5.47+5.79+2.51); mid-width: Fe, I=1.85, II=1.93, III=3.62, IV=2.70; Ti, I=2.06, II=2.05, III=2.51, IV=2.08. Palp: length: 19.18 (6.48+3.97+4.47+NA+4.26); mid-width: Fe=1.45, Ti=1.91.

All segments of palp and legs covered with bristles of variable sizes, thicker on ventral side of all trochanters, femora and patellae of palp and of legs I and II, and on tibiae and metatarsi IV (some detached and missing after preservation); a few thinner, sub-equal and uncurved spinules on coxae II and IV (many detached mostly from coxa II after preservation); short spinules on tibiae of palp, legs I and II on distal half respectively, and metatarsi of legs I and II on proximal end, spinules absent on legs III and IV. Glabrous ventral band on either side of median mound of all trochanters; a pair of vertical glabrous bands on length of dorsal of all femora, patellae, and tibiae; single vertical glabrous band on proximal half of dorsal of all metatarsi. Palp with pointed prolateral spines on femora and patellae on distal end; pointed spines on metatarsi III and IV (all over ventral), and all tarsi (distal end). Ventral spines on tibiae II long, tapering (some detached and missing after preservation). Thick thorn-like slightly curved spines on length of lateral (promarginal and retromarginal) sides of tibiae and tarsi of palp; thick thorn-like slightly curved spines on lateral (promarginal and retromarginal) sides of tibiae, metatarsi, tarsi of legs I and II, leg III on patellae, tibiae, and metatarsi, and spines only on prolateral side of patellae IV (some detached and missing after preservation. palp: Ta, p=36, r=38, v=3; Ti, p=37, r=43; Pa, p=1; Fe, p=2. Leg I: Ta, p=9, r=10, v=4; Mt, p=30, r=39; Ti, p=29, r=45; leg II: Ta, p=12, r=6, v=3; Mt p=30, r=27; Ti, p=19, r=24; leg III, Ta, v=9; Mt, p=12, r=11, v=5; Ti, p=10, r=10; Pa, p=21, r=5; leg IV, Ta, v=23; Mt, v=9; Pa, p=38.

Clavate trichobothria absent; filiform of unequal length on dorsal side, arranged irregularly on proximal half of all tibiae and distal half of all metatarsi and tarsi, two regularly arranged rows on distal half of palp tarsi. Palp: Ti=10; Ta=10; Leg I: Ti=14; Mt=14; Ta=25; leg II: Ti=14; Mt=16; Ta=30; leg III: Ti=17; Mt=14; Ta=37; leg IV: Ti=17; Mt=12; Ta=18. Palp with single claw, bearing single tooth; all legs with three claws, one unpaired inferiorly (inferior tarsal claw) and a pair superiorly (superior tarsal claws); inferior claw without tooth, smaller than superior claws; superior claws of legs I and II equal and of legs III and IV unequal in size; superior claws of all legs with a tooth except for anterior superior claw on leg III of left side without tooth, and left superior claws on leg IV broken; all teeth bifid except a few which are entire.

Abdomen longer (16.44) than wide (11.98); oval, uniformly covered throughout with short and long setae (some detached and missing after preservation). Cuticle appears leathery, slightly rough; epigastric plate sclerotized, anteriorly glabrous. Two pairs of spinnerets, PLS tri segmented; segment lengths: proximal 1.54, middle 0.76, distal; midwidths 1.80, 1.45, and 1.08 respectively; all three segments covered with bristles of variable lengths which are denser on ventral side, joints glabrous; thick, blunt and pointed spigots on ventral side of all three segments but denser on middle segment; distal segment dome shaped. PMS unsegmented, 1.05 long, 0.55 wide, 0.39 apart; covered with bristles of variable lengths. Spermathecae paired, lobes with fairly widely spaced elongated stalks, slightly broader at base, gradually narrowing distally, both stalks covered with spermathecal pores and bent outward distally with globular apical lobes facing away from each other and upward, apical lobes roughly circular and moderately covered with spermathecal pores.

Colouration. In life (Based on Fig. 3A, B), Carapace, patella dorsal of palp and of all legs pastel orange overall; chelicerae, ocular area, caput, and dorsal of palp and all legs (excluding patellae) reddish brown; anterior lateral and anterior median eyes black, posterior lateral and posterior median eyes much lighter, yellowish white; bristles and spines on all segments brownish; abdomen uniformly brown dorsally and paler ventrally; maxillae, labium reddish brown; fangs, teeth, and cuspules much darker; sternum, coxae yellowish brown, sigilla reddish brown; palp and all legs yellowish brown ventrally; spinnerets light reddish brown overall.

Variation. Variation in mensural and meristic data for the paratype series is given in the Sup. Tables 1–3, respectively. All paratypes (Sup. Fig. 1) overall resemble the holotype except for the following characters: (1) cheliceral teeth: eight teeth in prolateral row and four in retrolateral row on either side in NRC-AA-1202; nine teeth in prolateral row and five in retrolateral row on either side in BNHS SP 404; seven teeth in prolateral row and four in retrolateral row on left side in BNHS SP 405 (we could not count these on right side as fang is tightly fixed); we could not check if there are any variations in these rows as fangs were tightly fixed in rest of paratypes, and could break if stretched; (2) spermathecae: stalk slightly longer in all paratypes; distal bend on stalk more prominent in NRC-AA-1200, NRC-AA-1202, BNHS SP 402, and in BNHS SP

Plate 3

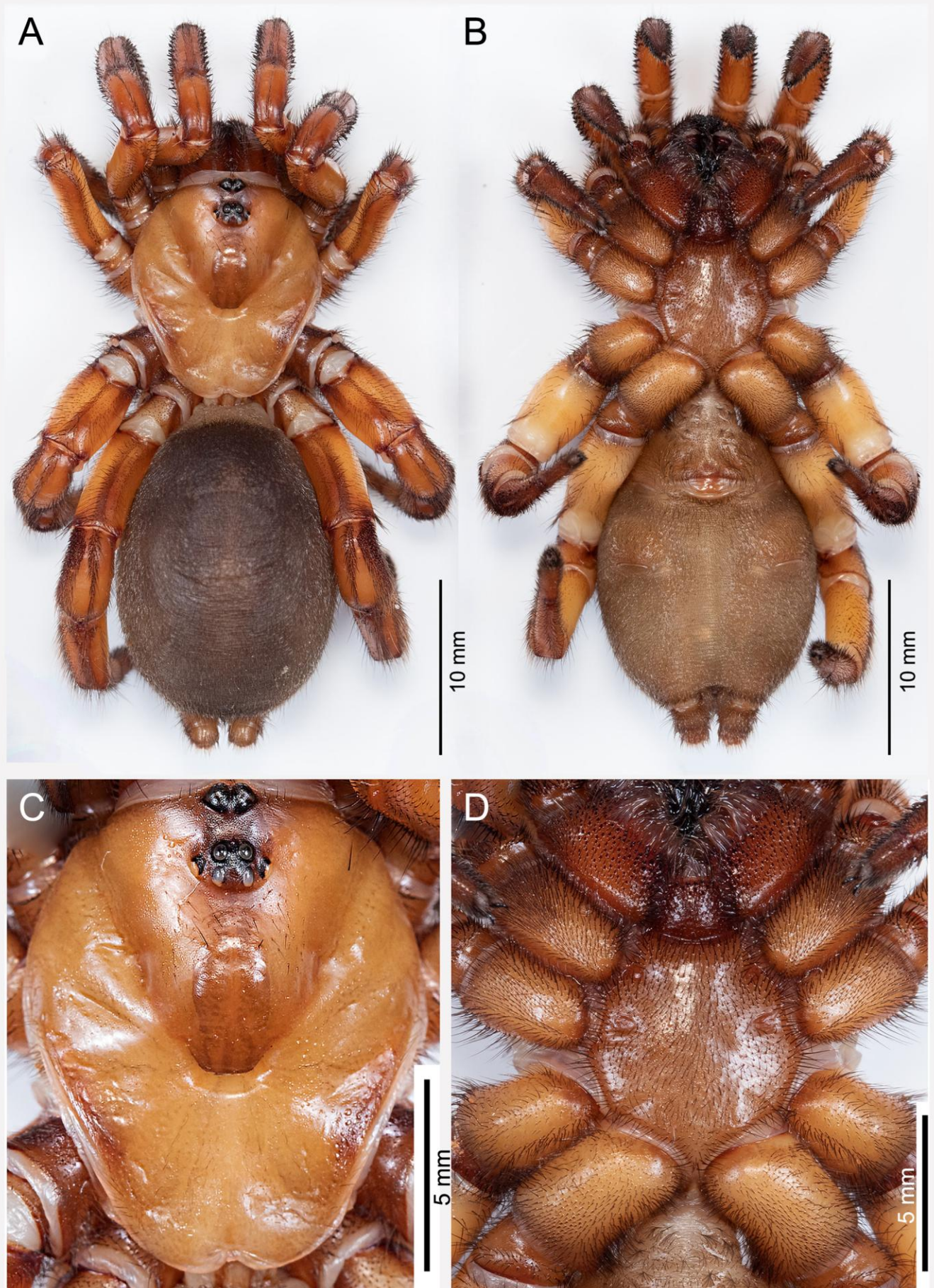


Figure 1. *Heligmomerus australis* sp. nov. (female, holotype, NRC-AA-1198): (A) dorsal and (B) ventral view of full body; (C) dorsal view of carapace; (D) ventral view of cephalothorax; © photo: A. Khandekar.

Plate 4

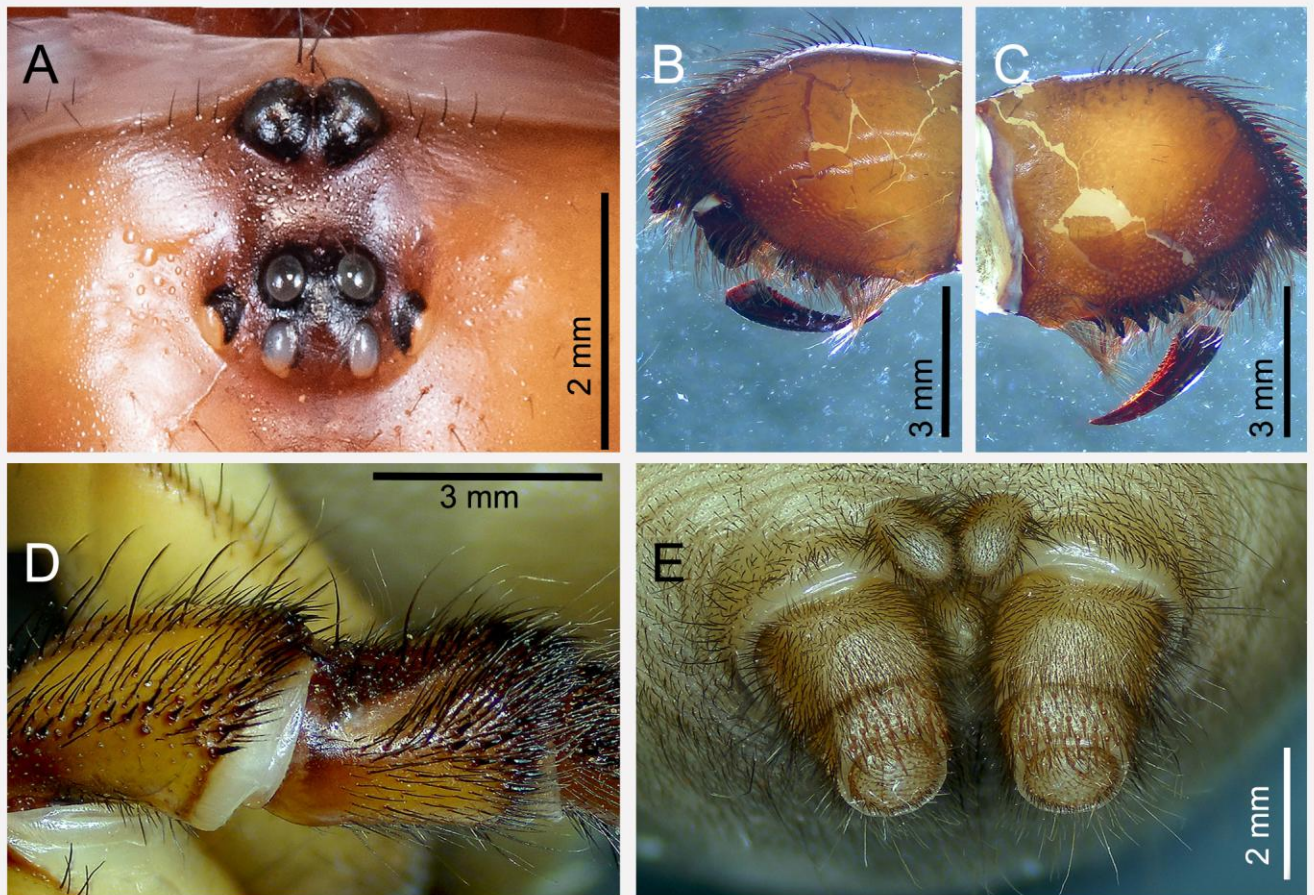


Figure 2. *Heligmomerus australis* sp. nov. (female, holotype, NRC-AA-1198): (A) dorsal view of ocular region, (B) retrolateral and (C) prolateral views of left chelicera, (D) prolateral view of tibia III, and (E) ventral view of spinnerets; © photo: A. Khandekar.



Figure 3. *Heligmomerus australis* sp. nov. in life (adult females): (A) holotype (NRC-AA-1198) and (B) para type (NRC-AA-1199); © photo: A. Khandekar.

Plate 5

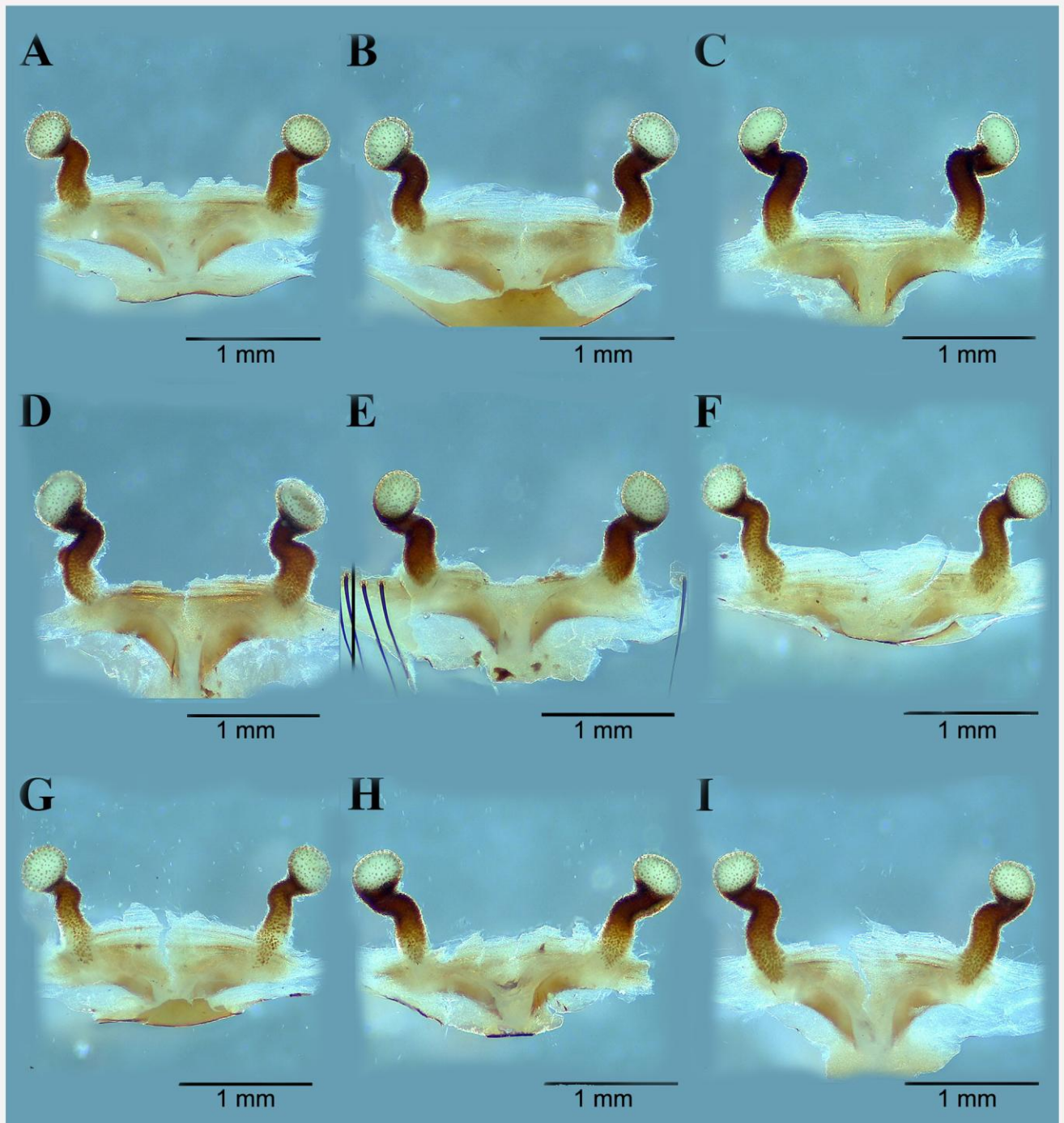


Figure 4. Spermathecae in dorsal view of *Heligmomerus australis* sp. nov.: (A) holotype (NRC-AA-1198); (B–I) paratypes (NRC-AA-1199, NRC-AA-1200, NRC-AA-1202, NRC-AA-1203, BNHS-SP 402, BNHS-SP 403, BNHS-SP 404, BNHS-SP 405); © photo: A. Khandekar

405; a small retrolateral tubercle posterior to distal bend on both stalks in NRC-AA-1202; apical lobes roughly oval in NRC-AA-1200 and BNHS SP 404; and apical lobes facing only upward in NRC-AA-1203, BNHS SP 404, and in BNHS SP 405 (Fig. 4). (3) Preservation artifact: tarsus of right leg III is detached and lost in NRC-AA-1199; right leg II is detached and lost in NRC-AA-1200; left leg II is detached and lost in NRC-AA-1201; abdomen, and left leg IV are detached and lost in NRC-AA-1202.

Etymology. The specific epithet is a noun in apposition and comes from the Latin *austra* for south, referring to the type locality of the new species, which is currently the southernmost known locality for the genus *Heligmomerus* on the Indian peninsula.

Comparison with Indian and Sri Lankan congeners. The females of *Heligmomerus australis* sp. nov., can be readily distinguished from all other Indian and Sri Lankan congeners (excluding *H. biharicus*, *H. garoensis*, *H. jagadishchandra*, and *H. wii*; known only from males, see Discussion) on the basis of the following non-overlapping characters: PME nearly one diameter apart from each other (vs. PME more than three diameter apart from each other in *H. barkudensis*, and two diameter apart from each other in *H. maximus*); AME-PLE nearly two times wider than AME-AME (vs. AME-PLE equal to AME-AME in *H. taprobanicus*); 4–7 cuspules in anterior row on labium (vs. three cuspules in anterior row on labium in *H. taprobanicus*); a few thinner, sub-equal and uncurved spinules on coxae II and IV (vs. short spinules present on coxae I, II, and IV in *H. barkudensis*; a band of thick, curved spinules only on coxa IV in *H. maximus*); a few thinner, sub-equal and uncurved spinules on metatarsi I and II (vs. spinules absent on metatarsi I and II in *H. maximus* and *H. prostans*); spermathecae with paired lobes having fairly widely spaced elongated stalks which are slightly broader at base and gradually narrowing distally, both stalks bent outward distally with circular to oval, globular, apical lobes facing away from each other and upward ($n=6/9$) or sometimes just facing upward ($n=3/9$); each stalk rarely with a small retrolateral tubercle just posterior to distal bend ($n=1/9$) (vs. spermathecae with paired lobes having fairly widely spaced short stalks which are straight and going away from each other distally with round, globular, apical lobes facing upward in *H. barkudensis*; spermathecae with

paired lobes having fairly closely spaced short stalks which are straight and going away from each other distally with round, globular, apical lobes facing upward in *H. prostans*; spermathecae with paired lobes having fairly closely spaced elongated stalks which are slightly narrower at base and gradually broadening distally, both stalks straight and going away from each other distally with roughly oval, globular, apical lobes facing upward in *H. maximus*); and maximum total length (in mm) 29.46 (vs. maximum total length 23.0 in *H. barkudensis*, 21.0 in *H. prostans*).

Distribution and natural history. *Heligmomerus australis* sp. nov., is currently known only from the type locality (foothills of Pothaimalai, outskirts of Kalakad-Mundanthurai Tiger Reserve, Tirunelveli District in Tamil Nadu) (Fig. 5).

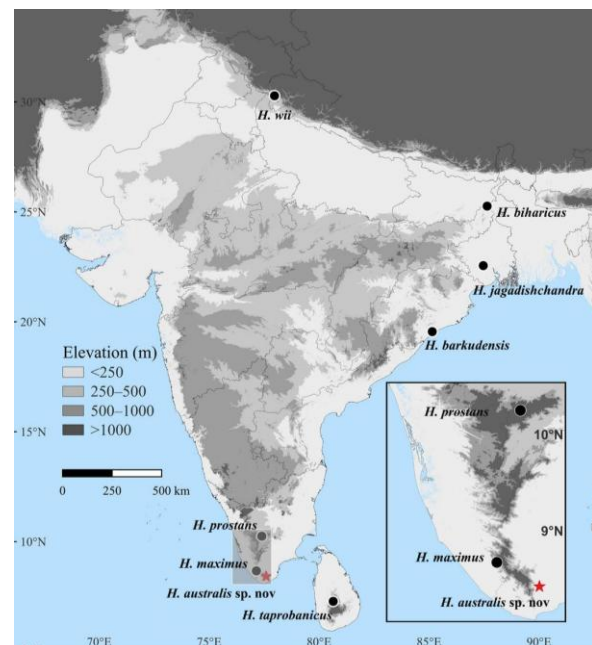


Figure 5. Elevation map of India and Sri Lanka showing type localities of *Heligmomerus* spp. (black circles), and type locality of *Heligmomerus australis* sp. nov. (red star).

The active burrows of the new species ($n \geq 15$) were located on fully or partially exposed flat surfaces of reddish, gravelly soil in savanna grassland habitat during a few hours of fieldwork in the morning (0800–1100 hrs.) (Fig. 6A). Upon opening of the doors by us, the spiders were initially observed to be deep inside the burrows but came up immediately, closed the door and held it tightly from inside using their fangs and anterior legs. The spiders again retreated inside at the time of burrow excavation.

The burrows were large, maintaining similar widths throughout their lengths (burrow widths=28–34 mm; $n=10$) except for the chamber at the end, which was slightly wider. All the sampled burrows had a single entrance, covered with a marginally narrower door than burrows (door widths = 23–29 mm). The lid of each burrow was more or less round, tightly attached to the burrow anteriorly (hinge widths=20–25 mm); fairly thick (door thickness=2–5 mm), mainly made up of silk but was also covered above with small pieces of dried grass and algae, sand particles, and grass leaves on the edges (Fig. 6B). Most of the burrows were straight except a few ($n=3/10$) were slightly curved; and deep (burrow depths=300–450 mm). The burrows were heavily silked at the entrance, gradually becoming weaker as they go deeper (Fig. 6C). We also observed two spiderlings along with an adult female inside one of the burrows. We did not encounter any sympatric trapdoor spider species nor any other mygalomorph spider during our survey.

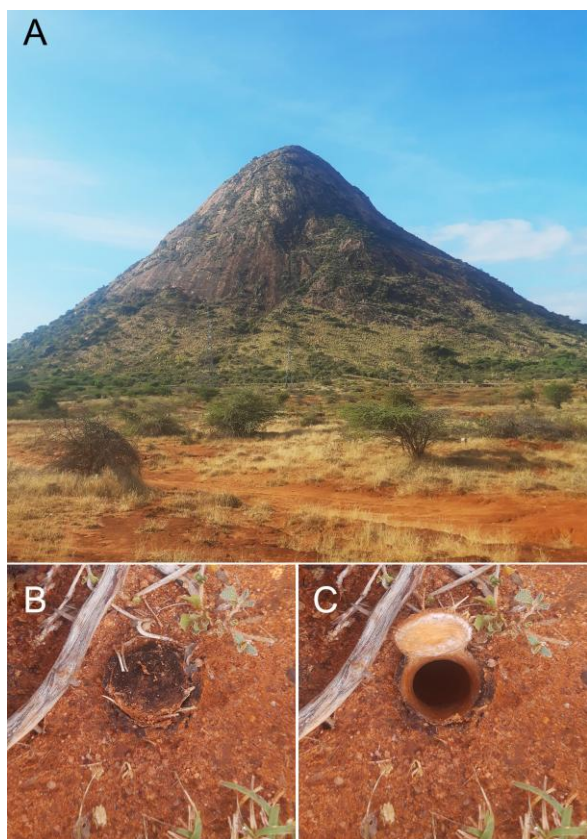


Figure 6. General habitat and burrow morphology of *Heligmomerus australis* sp. nov.: (A) habitat at the type locality showing savanna grassland with Pothaimalai hill in the background, (B) active burrow with closed lid, and (C) active burrow with open lid; © photo: A. Khandekar.

Discussion

Heligmomerus australis sp. nov. is the seventh species of the genus to be described from India and only the second to be reported from Tamil Nadu state. Four Indian species (including *H. australis* sp. nov.; described based on 10 females) are described based only on female(s) whereas descriptions of the three remaining species—*H. biharicus*, *H. wii*, and *H. jagadishchandra*—are based solely on males, which hindered the morphological comparison of *H. australis* sp. nov. against the latter three species. However, these species are geographically separated from the new species by a considerable distance, occupy different habitats, and have different elevation preferences (dense scrub forest between elevations of 200–400 m a.s.l., and 2153 km northeast for *H. biharicus*; Sal forest (*Shorea robusta*, family Dipterocarpaceae) patches at elevation of < 600 m a.s.l., and 2432 km north for *H. wii*; and open woody plantation area at elevation < 100 m a.s.l., and 1892 km northeast for *H. jagadishchandra*) and are currently known only from their respective type localities. Considering these unique geographical differences, it is highly unlikely that either of these three species would be conspecific with the new species described herein.

The transfer of *Idiops garoensis* to the genus *Heligmomerus* by Sen *et al.* (2012) is problematic for the following reasons: 1) instead of using type and/or topotypic specimens, the authors only relied on a single male specimen collected from “Scottish Church College campus, Kolkata in West Bengal”, which is about 375 km southwest from the type locality, and may not be conspecific with the type material; 2) they only provided superficial morphometric data of a male but did not explicitly mention how their specimen is morphologically conspecific with *I. garoensis sensu stricto*; 3) dorsal depression on tibia III in males is generally not very evident in these spiders but still these authors used only a single male specimen for the transfer, which is insufficient for their claim; 4) the authors missed the important notes by Gravely (1915, 1935) in which he discussed a single female specimen of *Heligmomerus* sp. he reported from the “Royal Botanical Gardens at Sibpur, Kolkata” (currently known as Acharya Jagadish Chandra Bose Indian Botanic Garden), which is just 8 km west of their locality and their male specimen most likely is of a species reported by Gravely and could represent another undescribed species. These

discrepancies have led us not to follow Sen *et al.* (2012) and continue to treat *H. garoensis* as *I. garoensis* until fresh topotypic specimens are collected (preferably both sexes or at least females) to confirm its placement. Interestingly, the type locality of recently described species, *H. jagadishchandra*, is about 93 km from the Scottish Church College Campus, Kolkata, from where Sen *et al.* (2012) reported the male specimen. However, *H. jagadishchandra* differs from the male specimen reported by Sen *et al.* (2012) in the ocular group wider versus longer (Pratihari *et al.* 2022).

Author contributions

All the authors contributed equally

Acknowledgments

We thank T. Bhargava (DFO, Jawadhu) for his help and coordination throughout the fieldwork; Y. Singh (Field Director), Gautham (DFO), Forest Range Officers K. Karmegam (Ambasamudram) and Balaji (Kalakad), Forest guards and watchers B. Raghu (Thirukurungudi), Sivasubramaniam for their support and help during the fieldwork at KMTR; V. Patil for his valuable assistance during the fieldwork; T. Karmakar (NCBS Museum and Research Collection Facility, Bengaluru) and R. Khot (BNHS, Mumbai) for helping with the specimen registrations at respective museums. Finally, we thank Robert Raven (Queensland Museum, Brisbane, Australia), Danniella Sherwood (Arachnology Research Association, UK), and Zeeshan Mirza (Max Planck Institute for Biology, Germany) for their reviews of the manuscript.

Research permits

Tamil Nadu Forest Department (Permit no. 53/2018)

Funding information

None

Supplemental data

<https://doi.org/10.47605/tapro.v14i1.350>

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Appendix: Material examined

- Heligmomerus maximus* Sanap & Mirza, 2015, holotype; adult female, BNHS SP 118, collected from near Picket Station, Peppara Wildlife Sanctuary, Kerala, India, by Rajesh Sanap and Zeeshan Mirza on 26 December 2013.
- Heligmomerus prostans* Simon, 1892, topotypes: one adult, one immature female, AK SC 2030, AK SC 2031, collected from Kodaikanal, Dindigul District, Tamil Nadu, India by Akshay Khandekar and team on 4 December 2022.